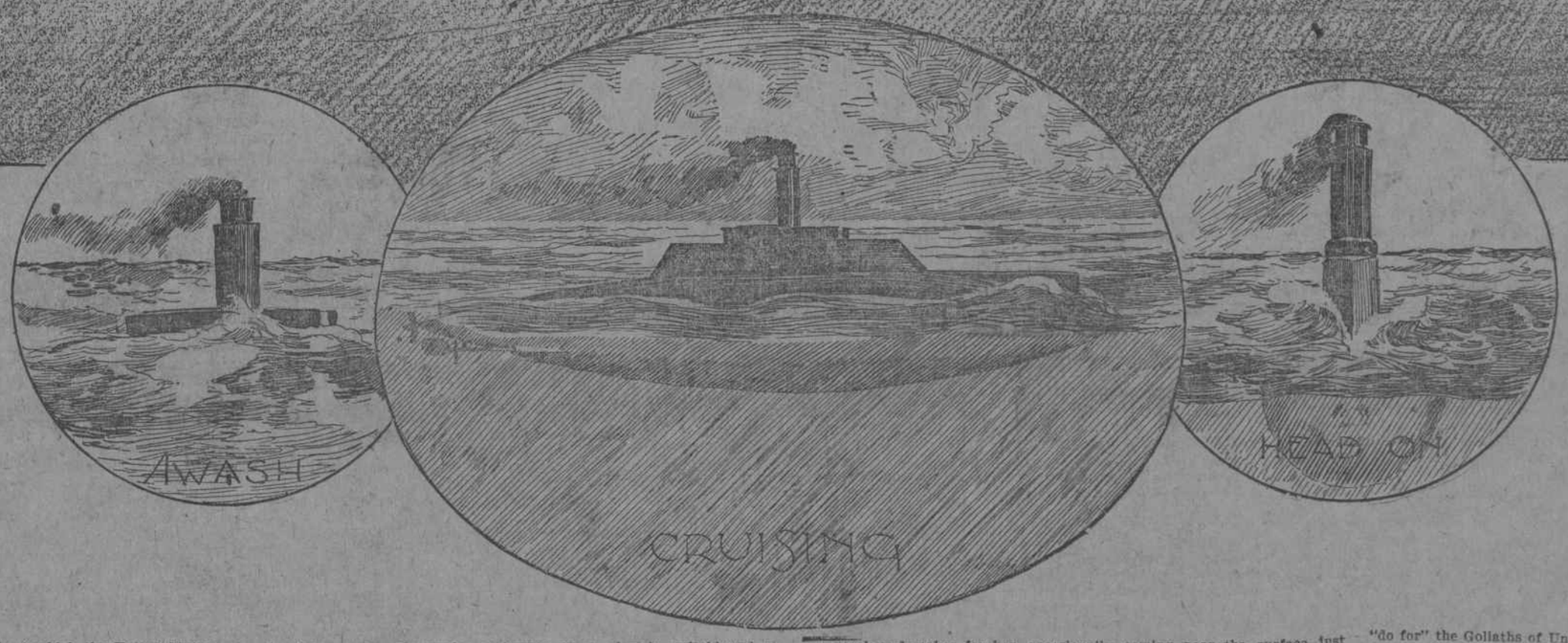
Pages 33 to 48. NEW YORK JOURNAL Pages 33 to 48.

SUNDAY, SEPTEMBER 20, 1896.—

THE NEW SUBMARINE WONDER FOR OUR NAVY.



A Torpedo Boat That Will Dive Like a Fish and Swim About Under the Water.

To Creep Under Big War Vessels and Blow Them Up Without Being Detected.

If the marvellous little submarine torpedo boat which the United States Government has nearly finished at Baltimore does all the astonishing things the navy experts promise, she will be in large measure a real fulfilment of the dreams of Jules Verne in his masterpiece of fiction—"Twenty Thousand Leagues Under the Sea."

This is the only new war vessel ever built by our Government upon which the longing eyes of ambitious naval officers were not turned. It is the first time the Navy Department has not been pestered by requests for assignments to duty on a new ship. And the reason is that the new boat is looked upon as a very promising submarine coffin for the first crew that ventures out in her.

Much of the warfare of the next century must be conducted by submarine fighting machines, and this extraordinary craft will, it is believed, solve the whole problem of under-water war, to which inventors and naval experts have for years given such an incredible amount of study. This experiment, if successful, may render the great navies of the world powerless.

The new boat is the object of rapt attention from the naval nations of the world, who have learned in these latter years to look to America for instruction in the science of naval building. There is much speculation and uncertainty, however, even among our own naval authorities as to whether the new craft will, upon practical trial, do all that her inventor, J. P. Holland, claims for her. Experiments with submarine war vessels heretofore have been so disastrous, and the manipulation of this strange craft is so different from anything hitherto taught in naval institutions, that the question of manning her is causing the Navy Department a world of trouble.

The craft is a wonder. It is nothing more nor less than a huge steel fish, with lungs capable of holding enormous quantities of fresh air, and possessing a single great eye for surveying the surface of the ocean on all sides while the vessel itself is submerged and invisible.

It has fins for diving and steering, and its vitality is furnished by steam and electricity.

The boat is practically the Nautilus of Jules Verne reduced from dream to reality. It is cigar-shaped, pointed at both ends; 80 feet long, 11 feet in diameter, and with a displacement of 118 tons when floating. Submerged, it displaces 138 tons. Under ordinary circumstances it runs on the surface like an ordinary torpedo boat, with a speed of sixteen knots an hour. At will it can be lowered just enough to be under water, save for a turret of Harveyized nickel-steel, which is surmounted by a chimney. The armor of the turret is 8 inches thick, and proof against rapid-fire guns. The chimney contains a tube by means of which the air inside of the boat is kept fresh.

In this half-submerged condition the boat is comparatively safe from any sort of attack. It offers so small a target that to hit it would be extremely difficult. And at any time it can sink entirely out of sight at a moment's notice.

The chimney and air-tube are withdrawn into the interior in a dozen seconds, the opening is hermetically closed, and the craft dives. It descends by taking water into compartments intended for that purpose, thus changing its specific gravity, and also by inclining horizontal rudders so as to cause the nose of the steel fish to turn downward. The depth attained is regulated automatically, the limit of safety being about 66 feet. At a much lower level the pressure of the water would crush the boat.

This submarine marvel has a double steel shell, and the space between the two coats is occupied by water ballast, coal bunkers and compressed air tanks. The interior of the craft is almost wholly filled with machinery. There is no space for officers or crew to sleep or eat. Food must be brought along in cooked and compact shape, to be consumed in such fashion as may be. Life on this ship, if ship she is, will not be a thing of joy. Much of the interior space is taken up by electric batteries and accumulators. Electric apparatus requires a good deal of room, but it makes no smoke and needs neither fuel nor air. There are also steam engines run by petroleum, and tubular boilers consisting of a labyrinth of pipes. The steam engines generate the electricity that is stored in the accumulators.

Suppose that the boat is travelling on the surface of the water, at a sixteen-knot gait, when the pilot, looking out through a glass window in the turret, sees a hostile warship coming. The warship is of such vastly greater size that he spies it long before the enemy's lookout can possibly see the diving craft. He touches a button on an electric switchboard at his side, which transmits an order to the engine room. Without half a minute's delay the boat sinks until her superstructure is just awash, so that only turret and chimney remain above the surface. The pilot is still able to continue his inspection of the warship through the window aforesaid. If the vessel comes near, and he thinks he is in danger from the big rifled guns, he touches another button on the switchboard, and in one minute by the watch the submarine craft is safe from all damage or pursuit, eighteen feet below the waves.

The instant the order is given a bit of mechanism is set in operation by which the chimney and air tube are telescopically withdrawn. Water flows into the empty compartments, and the horizontal rudders are inclined for diving. An indicator registers the depth, which is so regulated by an automatic device that the craft cannot descend below the safety limit. The steering is done by compass when under water. The interior of the submarine vessel is lighted by electricity, with incandescent lamps.

So long as the boat travels on the surface it is run by its triple expansion steam engines, which, small but powerful, actuate twin screws at the stern. When the craft has been wholly submerged these engines are stopped, but there is enough steam at high pressure left in the boilers to propel the vessel for a considerable time longer. When it is on the point of exhaustion the propellers are connected with the electric motors, which will run the boat for sixteen hours.

The vessel makes its own electricity by means of its steam engines and stores it in the accumulators. This point gives to the Holland boat an immense advantage over most of the foreign submarine vessels, which depend wholly on electricity for motive power, and are obliged to go to the shore at short intervals for the purpose of refilling their storage batteries.

When the boat dives valves are opened from the tanks, which contain air condensed under a pressure of 2,000 pounds to the square inch. By this means the atmosphere inside of the submarine vessel is kept good for half a dozen hours. In case it gets close and bad, the foul air may be pumped out. It is not necessary for the craft to come to the surface even when the air stored in her reservoirs has been exhausted. In such a case a two-inch hosepipe is unwound from a reel, its free end being attached to a float, which, when released, rises to the surface of the water, carrying with it the hose. Through this fresh air is pumped into the vessel, and the storage tanks are refilled under pressure. Thus is will be seen that the boat is able to stay under water almost indefinitely, not being obliged to come to the surface to take breath. Three days' provisions are carried for the persons on board, four officers and eight machinists.

The most wonderful thing about this boat, however, is its organ of vision for seeing while submerged. It has a single huge eye, by means of which it is able to survey the ocean's surface, though itself sunk some fathoms deep, and invisible. The vessel does not need to rise above the waves in order that the pilot may perceive "where he is at." It comes up merely to within a few feet of the surface, and a long tube is elevated vertically out of the water. The tube contains a simple arrangement of lenses and mirrors. The lower end of it descends into the steering room of the boat, where there is a pivoted circular table covered with a white cloth. The device is an application of the familiar camera lucida. By moving the pivot table this way and that the pilot can scan the surface of the ocean for miles around. Every sail, every ripple, is as clear to his eye as if he were on the deck of a ship in the open air above.

In her bow the boat has two torpedo tubes for the discharge of automobile torpedoes of the Whitehead or Howell variety. She carries five of these torpedoes, which are projected by compressed air. Such a torpedo is a hollow, cigar-shaped receptacle, much like a fish, carrying in its front end 200 pounds of gun cotton. After being discharged from the tube it runs itself, being driven by a screw, with compressed air for motive power. It may be shot with accuracy at a mark 200 yards away, and it will run 1,000 yards or more, exploding on impact.

Let one of these fearful projectiles strike the strongest battleship, and the proud vessel of steel and iron, a floating mass of machinery that has cost $4,000,000 to construct, is transformed in a moment into an iron coffin, carrying officers and crew to the bottom. Having delivered the fatal blow, the submarine boat glides away, to come up presently near the surface, and with the aid of her camera lucida to look around upon the scene of the destruction she has caused—herself at the same time invisible and safe from pursuit. Such a craft as the Holland boat would never try to attach a torpedo to the bottom of the ship. She picks out a vessel for attack and makes for her, occasionally coming near the surface just long enough to permit her commander to make sure of his course.

The Holland boat is able to keep at sea in bad weather. Its radius of action, travelling on the surface, is 1,000 miles; submerged, it can go sixty miles. Its speed under water is eight knots, and it can be perfectly controlled. Special devices provide against every conceivable accident. In case it is desired to check the downward movement of the boat quickly, a touch on a button connects a compartment of water at the bow with a tank of compressed air. The expanding air drives the water out of the compartment, thus lightening the boat. If the submarine vessel gets stuck in the mud at the bottom, or for some other reason is not able to rise, officers and crew will put on diving suits and escape through a hatchway.

The boat is to cost only $150,000. If it proves a success, two others are to be built. This one, Mr. Holland says, is not so big as it ought to be, but its size was limited by the appropriation. As soon as it is finished, it will be taken for a trial trip down the Chesapeake.

The country which possesses a perfect vessel of this kind before any of the others will not be mistress of the seas necessarily, but its territory will be safe from bombardment and from the disembarkment of troops by ships. No nation so sorely needs such a protection as the United States. According to Captain Mahan, the greatest living naval strategist, in case of war with a strong naval power our entire force of battle and coast defence ships would have to be concentrated at New York, leaving our other ports unprotected. What we need is an efficient and available means of preventing hostile ships from coming within bombarding range of our coast cities.

These submarine vessels can be built quickly and cheaply. It is reckoned that as many of them as are wanted for the protection of all our sea and lake ports could be delivered to the Navy Department in four months from the date of contract. Scores of shipyards and boiler and machine shops would be capable of constructing them in that time, working day and night. At the rate of six for $1,000,000, they could not be considered expensive, when compared with cruisers at $2,000,000 each, and battleships at $4,000,000 each. Twenty or thirty of them would solve the problem of defending 10,000 miles of seacoast.

Much emphasis has been laid upon the fact that the Holland boat is able to stay beneath the water for a great length of time—even for days together if necessary. But, as a matter of fact, it is not intended to follow any such course of proceeding in case of war. The trouble about submarine vessels hitherto has been that they were expected to find their way about under water. The practicability of so doing is limited. Under water, save for the camera lucida, the submarine craft is wretchedly near-sighted; at a depth of half a dozen fathoms the pilot cannot see a dozen feet away. As for the camera lucida, the rocking of the boat disturbs considerably the images of ships or other objects reflected upon the pivoted table, and its sighting tube is more or less likely to be observed by an enemy on the sharp lookout.

The Holland boat during active operations may have to come to the surface at frequent intervals, rising so as to show its turret above the waves. As has been said, the turret is proof against rapid-fire guns. A lucky, plunging shot from a military top might do damage, but of this there would be little chance, inasmuch as accurate fire from the guns in the tops of a warship is almost out of question, owing to the swaying of the vessel. Having taken a look at the ship to be attacked, the submarine boat will dive and run under water five hundred yards or so, then rising again.

The submarine boat would be useful in sinking blockading ships, and thus preventing a close blockade of any port. Her legitimate role would be to assail big ships and avoid small ones. When the steel cigar is within three hundred yards of a big vessel it makes a final dive and delivers one or two torpedos from its bow. Future boats of this kind are likely to have one torpedo tube in the bow and another in the stern, so as to be able to deliver a second torpedo at the ship after passing under her keel.

Suppose a hostile fleet were approaching New York, and that two or three such submarine boats lay outside the harbor. The boats would take in their smokestacks, sink to the "a-wash" condition and wait. If light torpedo destroyers were sent ahead by the enemy, the submarine boats would sink below the surface. If there were a line of submarine boats, they could not possibly be driven from their station. Torpedos and gun fire would be useless against them, and the admiral who would attempt to take his fleet through such a line for the sake of bombarding a city would be counted almost foolhardy.

The Confederate Government during the late Civil War built several submergible vessels, which were called "Davids," because they were meant to "do for" the Goliaths of Uncle Sam's navy. One of them blew up the U. S. S. Housatonic in Charleston Harbor. The Housatonic sank. She was inspected by divers, who found the torpedo boat sticking in the hole which she had made, with all of her crew dead in her. She had been sucked in by the inrush of water.

This submarine craft, the first successful war engine of its kind in history, had already had an extraordinary history before it encountered the Housatonic. It was built at Mobile in 1863 of plates of boiler iron, and had the shape of a cigar. It was 35 feet long, and was provided with lateral fins, which helped it to dive or rise. It was submerged by taking water into a compartment, which was emptied by pumps when it was desired to ascend. Nine men were required to operate the machine, one steering, while the eight others worked the propelling machinery. The craft could be sunk at pleasure to any required depth, or it could be propelled on the surface at the rate of seven knots. Under water it moved at about half that speed.

The boat carried at her front end a spar twenty feet long, to the extremity of which was attached a torpedo loaded with sixty pounds of powder. When running at the surface she presented a very small target; her chief disadvantage was that she was unmanageable and, therefore, dangerous in a seaway. It was intended that she should approach a vessel at anchor, pass under the keel and explode the torpedo by striking it against the side or bottom of the ship attacked. She could remain submerged for half an hour.

On being finished she was sent to Charleston, which was at that time blockaded by a Federal fleet. Soon after her arrival Lieutenant Paine, of the Confederate Navy, with eight others, volunteered to attack the Union ships with her. While preparations were being made for the attempt, the swell of a passing steamer swamped the boat, and she sank. All hands were drowned, except Lieutenant Paine, who chanced at the moment to be standing in the open hatchway.

The "David" was raised and Lieutenant Paine once more volunteered to command her. One day she was lying off a dock near Fort Sumter when she capsized suddenly and six of her crew were drowned. Paine and two others escaped. Once more she was raked up and prepared for action. Mr. Aunley, one of her contractors, made an experimental cruise with her in Stono River. She stuck her nose in the mud at the bottom and stayed there for many days with her crew of nine dead men. When she was brought to the surface again an attempt was made to dive with her under the Confederate receiving ship Indian Chief. She fouled the vessel's cable and became a coffin for every man on board.

Thus far the boat had destroyed thirty-two lives. However, those in charge were not discouraged, and other brave men were eager to renew the attempt. On the night of February 17, 1864, Lieutenant Dixon and eight others went out of Charleston Harbor for the purpose of attacking the Housatonic, which was a fine new sloop of war of 1,244 tons and carrying thirteen guns.

According to the official report, made subsequently to the Navy Department at Washington, it was 8:45 p. m. when the officer of the deck on board the Housatonic took notice of something in the water about 100 yards away. It looked like a floating plank, but the quartermaster suggested that in his opinion it was a school of fish. The discovery that it was a torpedo boat spread panic, but it was made too late. The "David" was so close that the ship's guns could not be brought to bear on her. A few harmless revolver shots were fired at her, and the ship tried to escape by steaming ahead. She had just begun to move when the explosion came.

The torpedo struck the Housatonic on the starboard side, in line with the magazine, and the explosion was terrific. It tore the stern of the ship to fragments; a piece ten feet square was blown out of the quarter deck, and the water for quite a distance around was covered with splinters. The vessel sank stern first, inside of a minute. Most of the crew saved themselves by ascending the rigging, and the Canandaigua rescued all hands, save one officer and five men.

Several years after the war the wreck of the little submarine boat was raised and there, in her hull, were found the skeletons of the nine Confederate volunteers who went down to death in her.

England, France, Germany, Spain, Portugal and Italy all have submarine boats of various types, but none of them is deemed satisfactory. The best of them is the Gustave Zede, owned by France. It is run by electricity, obliging it to go to the shore at brief intervals for the refilling of its storage batteries. The apparatus is so complicated as to be difficult of management, and not long ago 100 of the accumulators exploded, causing a damage of $20,000.